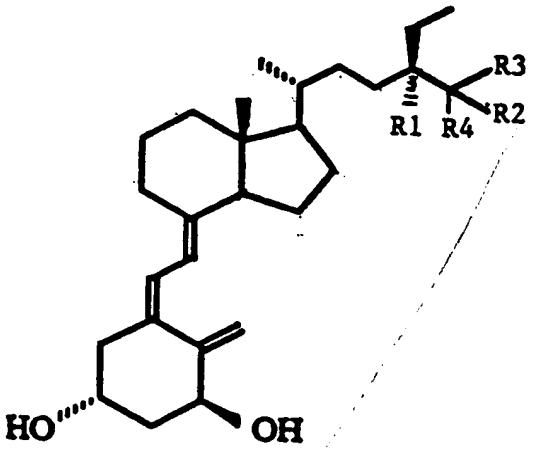
CLAIMS

We claim as our invention:

1. A compound of formula I:



I

wherein:
R1 is hydrogen;
R2 is $-CH_3$;
R3 is $-CH_3$; and
R4 is hydrogen.

2. A compound of formula I wherein:

a. R1 is hydrogen;
b. R2 is -OH;
c. R3 is $-CH_3$; and
d. R4 is $-CH_3$.

3. A compound of formula I wherein:

a. R1 is -OH;
b. R2 is hydrogen;
c. R3 is $-CH_3$; and
d. R4 is $-CH_3$.

4. A compound of formula I wherein:

a. R1 is -OH;
b. R2 is -OH;
c. R3 is $-CH_3$; and
d. R4 is $-CH_3$.

5. A compound of formula I wherein:

a. R1 is hydrogen;
b. R2 is -OH;
c. R3 is $-CF_3$; and
d. R4 is $-CF_3$.

6. A compound of formula I wherein:

a. R1 is hydrogen;
b. R2 is hydrogen;
c. R3 is $-CH_2OH$; and
d. R4 is $-CH_3$.

7. A method of synthesizing the compound of formula I comprising the steps of:

(1) adding tosyl chloride to stigmasterol to make stigmasterol tosylate;

(2) refluxing the stigmasterol tosylate with potassium acetate in methanol to prepare stigmasterol methyl ether;

(3) shaking the stigmasterol methyl ether in ethyl acetate and Pd-C to make sitosterol methyl ether;

(4) refluxing zinc acetate added to a solution of sitosterol methyl ether in acetic acid to make sitosterol acetate;

(5) refluxing a suspension of sitosterol acetate, anhydrous $NaHCO_3$ and dibromantin in heptane; adding THF and tetrabutyl ammonium bromide and tetrabutyl ammonium fluoride and s-collidine to make 7-dehydrositosterol acetate;

(6) adding lithium aluminum hydride to the 7-dehydrositosterol to make 7-dehydrositosterol;

(7) dissolving the 7-dehydrositosterol in anhydrous

ether and benzene and irradiating to make previtamin D_5;

(8) heating a solution of previtamin D_5 in ethanol to make crude vitamin D_5;

(9) adding p-toluene sulfonyl chloride to a solution of vitamin D_5 in pyridine to make vitamin D_5 tosylate;

(10) adding sodium bicarbonate to a solution to a solution of vitamin D_5 tosylate in methanol to make 3,5 cyclovitamin D_5;

(11) adding t-butyl hydroperoxide to a suspension of selenium dioxide in dry methylene chloride and adding a solution of 3,5 cyclovitamin D_5 in dry methylene chloride to make 1α-Hydroxyvitamin-3,5 cyclovitamin D_5;

(12) stirring and heating a solution of 1α-hydroxy 3,5-cyclovitamin D_5 in DMSO and acetic acid to make a mixture of 1α-Hydroxyvitamin D_5 and its 5,6-trans isomer; and

(13) dissolving the mixture of 1α-Hydroxyvitamin D_5 and its 5,6-trans isomer in ethyl acetate and then maleic anhydride, purifying and crystallizing to make 1α-Hydroxyvitamin D_5.

8. A method of preventing the development of carcinogen-induced precancerous lesions which comprises

administering a therapeutically effective amount of the compound of claim 1 to an individual at risk of developing cancer.

9. A method of treating cancer which comprises administering a therapeutically effective amount of the compound of claim 1 to an individual in need of such treatment.

10. The compound of claim 2 with R stereochemistry at carbon centers C_1, C_3, C_{20} and C_{24}.

11. The compound of claim 3 with R stereochemistry at carbon centers C_1, C_3, C_{20} and C_{24}.

12. The compound of claim 4 with R stereochemistry at carbon centers C_1, C_3, C_{20} and C_{24}.

13. The compound of claim 5 with R stereochemistry at carbon centers C_1, C_3, C_{20} and C_{24}.

14. The compound of claim 6 with R stereochemistry at carbon centers C_1, C_3, C_{20} and C_{24}.